Then to U* $= 55° 26' 57''$ Log tang^t. 10 1620405
Add half the fum of the log^s. of the aphelion and perihelion dift.   6.2800876
                                                              16.4421281
Deduct the log. of the mean dift.   6 2805800
The remainder is the log. tang^t. of $55° 25' 7''$ 10.1615481

    The co-equate or true anomaly $55° 15' 7''$ is the meafure of the angle ACr, and when deducted from the mean anomaly will leave the equation of the centre : as for example, $55° 25' 7''$ taken from $60°$ the mean anomaly ufed in the foregoing explanation the remainder $4° 34' 53''$ will be the equation of the centre anfwering to it.—The equation of the centre muft be negatively applied while the planet is moving from the aphelion, to the perihelion, and *vice verfa.*

<div align="center">I am, Sir, with much efteem,

Your real Friend,

ANDREW ELLICOTT.</div>

To Mr. Robert Patterfon.

<div align="center">

N°. IX.

Method of raifing the common Logarithm of any Number immediately, by DAVID RITTENHOUSE, *Prefident of the Society.*

</div>

Read Aug. 12, 1795.   THE logarithm of any number is the index of that power of 10 which is equal to the given number. This index will always be fractional, unlefs the number be divifible by 10 without any remainder.

    If the number be greater than 10, divide it by the higheft power of 10 that will leave the quotient not lefs than 1. The index of that power is the firft figure, or index of the logarithm. Divide 10 by the quotient fo found raifed to the higheft power that will leave the new quotient not lefs than unity. Divide

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   * *Note.* When U exceeds 90° take its fupplement and in that cafe deduct the refult of the calculation from two right angles, and the remainder will be the true anomaly.

<div align="center">K</div>   the

the laft divifor by the laft quotient raifed to its proper power, and proceed in this manner until a fufficient number of divifions are made, which will be when the quotient approaches nearly to unity. Make a compound fraction, taking the fucceffive indexes of the powers you divide by for denominators and unity for numerators. Reduce this compound fraction to a fimple one, and that by divifion to a decimal fraction, which together with the index firft found (if any) will be the logarithm required.

Example of the Calculation.

Required the Logarithm of 99.

Divided by $\dfrac{99}{10^1} = 9.9.$ Here 1 is the index.

Divided by $\dfrac{10}{9.9^1} = 1.010101 = a.$

(in left margin, rotated:) a, raifed to its higheft power, 228.

$$a a = 1.020304$$
$$20406$$
$$306$$
$$4$$

$$a^4 = 1.041020$$
$$41641$$
$$1041$$
$$21$$

$$a^8 = 1.083723$$
$$86698$$
$$3251$$
$$759$$
$$22$$
$$3$$

$$a^{16} = 1.174456$$
$$117446$$
$$82212$$
$$4698$$
$$470$$
$$59$$
$$7$$

$$a^{32} = 1.379348$$

Firft quotient,   9.9
Divided by $a^{228} = 9.889521$ $\Big\}= b = 1.001059$
                        1001

$$.010479$$
$$9889$$

          59

$$590$$
$$494$$

$$b^2 = 1.002119$$
$$2004$$
$$119$$

$$96$$
$$89$$

$$b^4 = 1.004242$$
$$4017$$
$$201$$

$$7$$

$$42$$

$$b^8 = 1.008502$$
$\times$ by b 1009
           59

$a = 1.010101$
Divided by $b^9 = 1.009570$ $\Big\} = e = 1.000526$
                 526

$$b^9 = 1.009570$$

$$.000531$$
$$505$$

$$c^2 = 1.001052$$

$$26$$

Calculation

Calculation Continued.

$a^{32} = 1.379348$
     413804
      96554
      12414
       415
        55
        11

$a^{64} = 1.902600$
    1.712340
      3805
      1141

$a^{128} = 3.619886$
$\times$ by a^{64} 3.257897
      7240
      2172

$a^{192} = 6.887195$
$\times$ by a^{32} 2.066158
    482104
     61985
      2066
       275
        55

$a^{224} = 9.499838$
$\times$ by a^{4} 379993
     9500
      190

$a^{228} = 9.889521$

Divided by $\left. \begin{array}{l} b = 1.001059 \\ c^{2} = 1.001052 \end{array} \right\} = d = 1.000007$
$\overline{\hspace{3cm}}$
                   7

The quotient d, is now so small that it is not necessary to proceed further in this way, for the decimals of c, divided by the decimals of d will give the power required, viz. 75.

Making a compound fraction, as before directed, with the several powers of the divisors in the order they stand we have.

$$1 \cfrac{1}{1 \cfrac{1}{228 \cfrac{1}{9 \cfrac{1}{2 \cfrac{1}{75}}}}}$$

Which reduced   75

Gives the $151 = 75 \times 2 + 1$

        $1434 = 151 \times 9 + 75$

        $327103 = 1434 \times 228 + 151$

Simple fraction $=$
        $328537 = 327103 \times 1 + 1434$

Denominator $\diagdown$ Numerator
$328537) 327103,0 \,($ .995635194.8. The
        2956833   decimal part of the
       $\overline{3141970}$ log. of 99. true to
       2956833   the 9th place, and
       $\overline{1851370}$ 3 too much in the
       1642685 10th.
       $\overline{2086850}$
       1971222
       $\overline{1156280}$
        985611
        $\overline{170669}$
        164268
         $\overline{6400}$
         3285
         $\overline{3115}$
         2957
          $\overline{158}$
          131
          $\overline{27}$